Digital RoamAbout ™ 2400 FH/ISA and PC Card

Owner's Manual

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This document describes how to install and configure the Digital RoamAbout FH/ISA and PC Card network adapters.

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Digital Equipment Corporation

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Preface

About This Guide

This guide provides installation and configuration information for the Digital RoamAbout™ 2400 FH/ISA and 2400 FH/PC Card network adapters.

Who Should Use This Guide

This guide is written for users who install and configure the Digital RoamAbout FH (Frequency Hopping) network adapters.

Organization of This Guide

This guide is organized as follows.

This Chapter:	Contains:
1	An overview of the RoamAbout products and installation requirements for the RoamAbout FH products.
2	Brief step-by-step instructions for installing the RoamAbout FH network adapters.
3	Detailed instructions for installing the RoamAbout FH hardware.
4	An overview of configuration considerations and the software configuration parameters.
5	Detailed instructions for installing the RoamAbout software driver in a PATHWORKS environment.

This Chapter:	Contains:
6	Detailed instructions for installing the RoamAbout software drivers in a NetWare environment.
7	Detailed instructions for installing the RoamAbout software driver in a Personal NetWare environment.
8	Detailed instructions for installing the RoamAbout software driver in a Windows for Workgroups environment.
9	Suggestions for improving RoamAbout performance.
10	Descriptions of common problems and possible solutions.
A	Instructions for setting the RoamAbout FH/ISA interface card DIP switch.
B	Descriptions of the RoamAbout FH diagnostic utilities.
C	The RoamAbout FH physical specifications.
Glossary	Definitions for RoamAbout-related terms.

Terminology

This guide uses the following terms and abbreviations.

Term/Abbreviation	Meaning
Digital RoamAbout Access Point	A 2-port transparent bridge that connects a wireless LAN to a wired Ethernet LAN.
FH	Frequency Hopping. A spread-spectrum technology where the signal hops from frequency to frequency.
Mobile end stations (MES)	Any portable computer such as a mobile PC, laptop, notebook, or PDA that uses a wireless network adapter for LAN connectivity.

Term/Abbreviation	Meaning
PC Card	Same as PCMCIA (Personal Computer Memory Card International Association). PCMCIA is an emerging standards body for mobile computing peripherals. The association's goals are to establish and maintain a worldwide standard for option cards.
Radio module	A wireless network adapter component that consists of an antenna and radio circuitry.
RoamAbout	Refers to Digital RoamAbout, Digital Equipment Corporation's family of wireless LAN products.
Wireless LAN	A collection of end-user systems connected together using a medium such as radio frequency or infrared technology.
Wireless network adapter	A devices that provides connectivity between stations in a wireless LAN.

Conventions

This book uses the following conventions.

Convention	Meaning
`Monospaced type`	Indicates system output or user input.
CAUTION	Provides information to prevent damage to equipment or software.
Italic type	In command lines, indicates variables for which the user enters values.

1
Product Overview

About the Digital RoamAbout™ FH Products

What Are Digital RoamAbout FH Products?

Congratulations on your purchase of the Digital RoamAbout FH network adapter which is a member of the Digital RoamAbout family. As with all members of the Digital RoamAbout family, Digital RoamAbout FH network adapters are long range, high-performance LAN adapter cards that allow your computer to communicate with other computers on the network without wires.

The Digital RoamAbout FH network adapters are designed to be “plug-and-play” products. In most cases, you can use the default settings and just install the adapter card into a standard PC/AT bus slot or a PC Card (PCMCIA) Type II slot and load the driver — the same way you are used to installing wired Network Interface Cards (NICs).

The Digital RoamAbout FH products are compatible with the RangeLAN2™ technology.

Digital RoamAbout Access Point

When used with the Digital RoamAbout Access Point, the Digital RoamAbout FH network adapters provide wireless connections to your network's existing electronic mail, printers, software applications, and other network resources.

Where to Use the Digital RoamAbout FH Adapters

You can install the Digital RoamAbout FH network adapters work with any network operating system that supports NDIS or ODI drivers, such as PATHWORKS, Windows for Workgroups, and NetWare. Your Digital RoamAbout FH wireless clients look like standard network nodes to the operating system.

The Digital RoamAbout Family

Digital RoamAbout products provide cable-free departmental local area networking for personal computers. This gives you the flexibility to relocate people and equipment, or to add more stations to your network, without the planning effort and cost of recabling. Because Digital RoamAbout products use spread-spectrum communications technology, they provide an inherent level of data security.

The Digital RoamAbout FH product family includes:

- **Digital RoamAbout FH/ISA**— A high-performance wireless LAN adapter that fits into a standard PC/AT ISA bus slot.
- **Digital RoamAbout FH/PC Card** — A high-performance wireless LAN adapter which fits into a PC Card Type II slot (also called a PCMCIA Type II slot) on a portable notebook, laptop or pen-based computer.
- **Digital RoamAbout Access Point** — A 2-port transparent bridge that connects a wired Ethernet (ThinWire™ or 10BaseT) local area network (LAN) and a wireless LAN. The Digital RoamAbout Access Point has a PC Card Type II interface that supports approved PC Card wireless network adapters.

System Requirements

- **For Digital RoamAbout FH/ISA:** A PC/AT computer or 100% compatible with an available ISA slot.
- **For Digital RoamAbout FH/PC Card:** A notebook or pen-based computer with a PC Card Type II slot. The computer must have either Card and Socket Services V2.1 or an Intel 82365SL PC Card controller chip. The computer must be capable of supplying 325 ma at 5 volts to the adapter.
- An application that uses NDIS or ODI drivers such as PATHWORKS, NetWare 3.1X/4.X, Personal NetWare, or Windows for Workgroups.
- At least one other Digital RoamAbout FH product installed on the network.
- MS-DOS Version 5.0 or later.

Typical Digital RoamAbout Network Configurations

Your Digital RoamAbout FH network adapter and driver software are designed for use with common industry-standard networking systems, including systems that support the Network Driver Interface Standard (NDIS) or Novell Open Data-Link Interface (ODI) such as PATHWORKS, LAN Manager and Novell NetWare.

Typical configurations include:

- Standalone Digital RoamAbout network, including one or more servers with clients.
- Physically separated Digital RoamAbout networks (for example, on different floors of the same building) connected by means of a wired backbone.
- Wired network with a Digital RoamAbout Access Point, allowing connection into the network from one or more Digital RoamAbout stations.

Digital RoamAbout FH Product Package

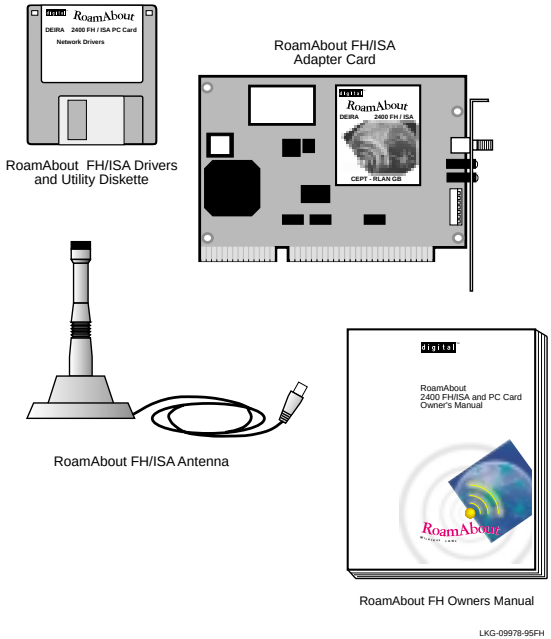
The Digital RoamAbout FH/ISA Product Package

Each Digital RoamAbout FH/ISA product package comes with:

- One Digital RoamAbout FH/ISA wireless network adapter card
- One 3-1/2" disk containing Digital RoamAbout drivers
- One antenna
- One *Digital RoamAbout 2400 FH/ISA and PC Card Owner's Manual*

If any of these items are missing or damaged, please contact your reseller or Digital sales representative.

Digital RoamAbout FH/ISA Components



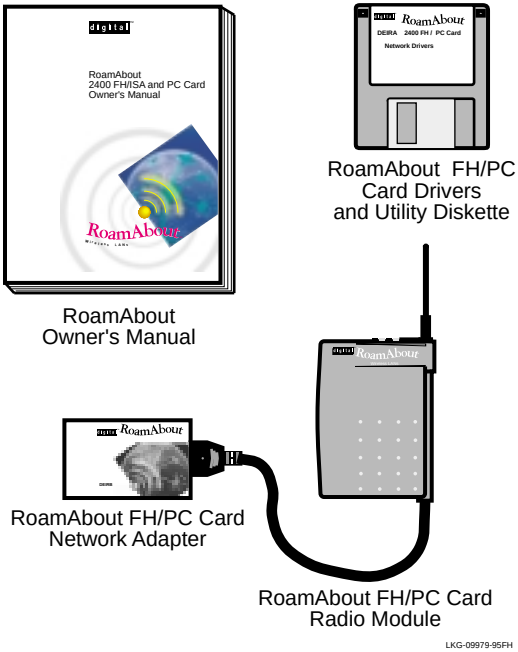
The Digital RoamAbout FH/PC Card Product Package

Each Digital RoamAbout FH/PC Card adapter package comes with:

- A standard PC Card Type II wireless network adapter card
- A radio module that connects to the card with a cable and mounts easily on a notebook or pen-based computer
- One 3-1/2" disk containing Digital RoamAbout drivers
- One *Digital RoamAbout 2400 FH/ISA and PC Card Owner's Manual*

If any of these items are missing or damaged, please contact your reseller or Digital sales representative.

Digital RoamAbout FH/PC Card Components



2

Quick Installation

Installing the Digital RoamAbout FH Network Adapter

Installation Procedure

If you are familiar with installing and setting up cards in an ISA bus or PC Card computer, use the following instructions. For detailed setup instructions, see Chapter 4.

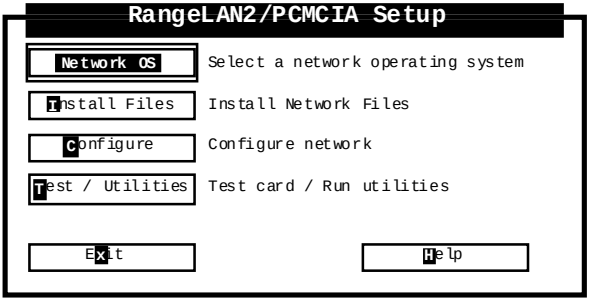
Step	Action
1	Install the RoamAbout FH network adapter card in your PC in an available slot and install the antenna or radio module. **FH/ISA Users:** Connect the antenna to the back of your computer. **FH/PC Card Users:** Connect the radio module to the adapter card.

2	Put the RoamAbout FH software driver diskette in a floppy drive on your PC and type the following to run the setup program:
	`C:\> A: (or B:)`
	`A:\> RL2SETUP`

3	Follow the on-screen instructions in the RL2SETUP program to install and configure the RoamAbout FH software driver. You can use either a mouse or keyboard to make selections in the RL2SETUP program.

RL2SETUP Window

The RL2SETUP window looks similar to the following:



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Recommendation

Proceed through the five buttons, Network OS, Install Files, Configure, Utilities, and Exit in order, starting with Network OS and working down. Use the Test/Utilities button last.

RL2SETUP Keys

The following table lists the keys to use if using a keyboard to make selections in the RL2SETUP program.

To Do This:	Press This Key:
Make a selection	**Alt** followed by highlighted letter
Access a Continue or OK button	**Enter**
Cycle through displayed buttons	**Tab**

Setup Hint

Roaming stations only roam among access points that have the same domain number. Configure each access point with **a different channel**, and use the **same domain number and security ID** for all units in a network that require roaming capability.

Bypassing the Setup Program

You can choose to bypass the setup program entirely, and follow the instructions in Chapters 5–7 to install the Digital RoamAbout FH software for your network operating system.

If Using NetWare File Servers

If you install the Digital RoamAbout FH/ISA network adapter and you plan to install the Digital RoamAbout software on NetWare file servers, you can use the RL2SETUP program only to configure the Security ID. To completely configure the Digital RoamAbout software, follow the instructions in Chapter 6.

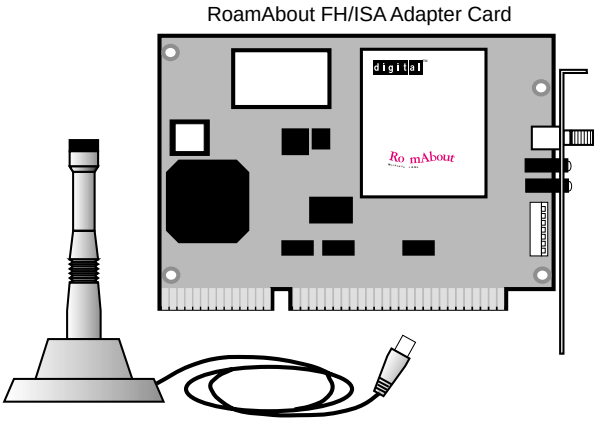
3
Digital RoamAbout FH Hardware Installation

Installing the FH/ISA Hardware

Check the FH/ISA Components

The Digital RoamAbout FH/ISA network adapter has two hardware components: the adapter card and the antenna.

Digital RoamAbout FH/ISA Adapter Illustration



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FH/ISA Adapter Card Installation Procedure

After setting the I/O base address, you are ready to install the adapter card. You can install the adapter card in a 16-bit or an 8-bit slot in your computer. Do the following.

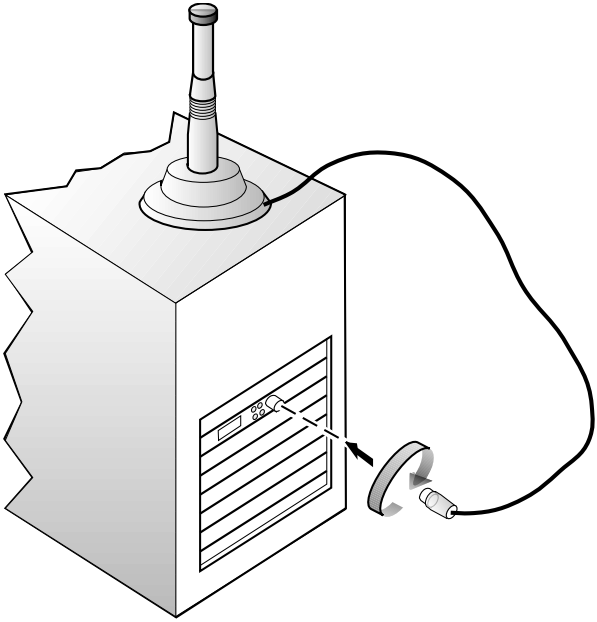
Step	Action
1	Turn off your computer and unplug it from the wall outlet for safety.
2	Remove the computer cover.
3	Locate an unused ISA slot and use a screwdriver to remove the retaining screw. Remove the metal slot cover.
4	Align the RoamAbout adapter card over the slot and insert it firmly into the slot.
5	Use the screw from the slot cover to secure the adapter card's metal bracket to the PC.
6	Replace the computer cover.
7	Plug the computer into the wall outlet.

FH/ISA Antenna Installation Procedure

Do the following to install the antenna.

Step	Action
1	Locate the antenna connector of the RoamAbout FH/ISA at the back of your computer. See following illustration.
2	Firmly insert the end of the RoamAbout antenna cable into the connector and turn it clockwise.
3	Place the antenna on top of your desk or computer.

Digital RoamAbout FH/ISA Antenna Attachment Illustration



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CAUTION

FCC regulations mandate that the RoamAbout/ISA antenna not be alterable. Therefore, RoamAbout FH/ISA uses a custom antenna connector. Do not attempt to use a different antenna or you may damage the connector and the adapter.

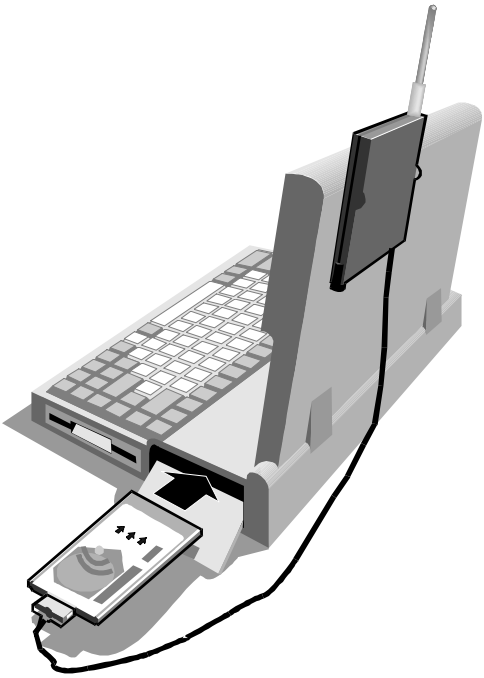
Installing the Digital RoamAbout FH/PC Card Hardware

Check the FH/PC Card Components

The Digital RoamAbout FH/PC Card network adapter has two hardware components, the adapter card and the radio module.

Digital RoamAbout FH/PC Card Adapter Installation

The following figure shows the correct installation of the adapter card and the radio module.



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FH/PC Card Adapter Card Installation Procedure

Install the hardware before installing the network driver software. The exact installation procedure for the adapter card varies depending on the model of computer you are using. The computer must have a Type II PC Card slot. Install the Digital RoamAbout FH/PC Card adapter by following the instructions in the hardware manual provided with your computer for general installation of PC Card Type II cards.

FH/PC Card Radio Module Installation Procedure

After you install the Digital RoamAbout FH/PC Card adapter card in your computer, connect the radio module to the adapter card. Do the following.

Step	Action
1	Plug the radio module cable into the adapter card to connect it. The cable connector is keyed to prevent incorrect attachment.
2	Place the radio module in a convenient location on or near your computer. **Mounting the radio module:** If you want to mount the radio module on your computer, remove the paper backing from the mounting strip on the back of the radio module and press it into place on the lid of the computer.

Recommendations

- Place the radio module as high as possible but make sure you can open and close the computer freely
- For optimum performance, attach the radio module so that the antenna can extend above the top of the computer.

4

Digital RoamAbout Software Parameters

Configuration Overview

Introduction

To enhance Digital's wireless solutions, Digital RoamAbout products offer transparent cell-to-cell roaming capability to break the wireless distance barrier. The user can move freely between the Digital RoamAbout Access Points in the network. When the roaming PC client leaves the transmission range of one Digital RoamAbout Access Point, the software automatically polls the other access points in the same domain to continue the network connection.

Configuration Recommendations

When you configure your Digital RoamAbout FH network adapter, consider the following:

- Install Digital RoamAbout Access Points throughout your building.
- Roaming stations only roam among access points with the same domain number. Configure each Digital RoamAbout Access Point with **a unique channel** and use the **same domain number and security ID** for all units in a network that require roaming capability.

- Equip the portable PCs with Digital RoamAbout FH network adapters and set them to the same domain as the other units in the network. As the portable PC *seamlessly* switches from cell to cell, its wireless connectivity is preserved.
- The Digital RoamAbout Access Point comes configured with a default domain number of 0 (zero). You may want to change this if you have 2 independent networks.
- The coverage of each access point must overlap in order to provide uninterrupted wireless access at any location within the building. The Digital RoamAbout Access Points act as “cells,” similar in concept to those of a cellular phone network. With the installed wireless network, mobile users attach to any access point within range.

Software Parameter Descriptions

Introduction

Digital RoamAbout wireless network adapters easily integrate into your existing network operating system. Each client on your network operates the same as any wired client PC except for the fact that wireless units share the same media or air space. The following Digital RoamAbout parameters allow the wireless network adapters to effectively share the same air space.

Station_Type

Configure each adapter as one of the following station types:

- Master =2
- Alternate Master =1
- Station =0

For performance considerations regarding the setting of this parameter, see Chapter 9.

Determining the Station Type

Each network must have one acting Master to coordinate communication between various Stations. The Digital RoamAbout Access Point defaults to the Master station type. You can configure the acting Master either as a Master or Alternate Master. Alternate Masters act either as a Master or a Station.

If an Alternate Master cannot locate any other master within range, it acts as a Master. If a Master is already present, then the Alternate Master acts as a Station. If the Master is turned off or out of range, then one of the other units configured as an Alternate Master becomes the Master.

Recommendations

- For most configurations, you should configure the Digital RoamAbout Access Point as the Master and all clients as Stations.
- If you are using the FH/ISA network adapter and plan to use a NetWare server in addition to the Digital RoamAbout Access Point, configure the NetWare server as an Alternate Master.

Station_Type Defaults

- The NetWare server driver defaults to a station_type of 2 (Master).
- The NDIS driver defaults to a station_type of 1 (Alternate Master).
- The ODI driver defaults to a station_type of 0 (Station).

Master_Name (optional)

This optional parameter of up to 11 characters specifies an alphanumeric name to simplify the identification of each master in your network.

Station Types Using This Parameter

Set this parameter for the station types indicated in the following table.

Master	Alternate Master	Station
Optional	Optional	Not Applicable

Channel (default = 1)

Each Master can select one of 15 channels to establish communications with stations. The channels are designated 1 through 15 with 1 being the default setting. The Digital RoamAbout Access Point autoselects an unused channel by default.

Each channel separates communications for each network to allow for higher data rate transmission capability in the same cell. Each channel provides a data rate of up to 1.6 Mbps.

Recommendation

For networks with multiple masters (for example, you can use multiple Digital RoamAbout Access Points), set each master to a different channel for optimum performance.

Station Types Using This Parameter

Set this parameter for the station types indicated in the following table.

Master	Alternate	Station
X	X	Not Applicable

Subchannel (default = 1)

If you need more than 15 masters in the same area, you can change the subchannel to a different value to separate the various networks. The subchannels are designated 1 through 15 with 1 being the default setting.

Station Types Using This Parameter

Set this parameter for the station types indicated in the following table.

Master	Alternate	Station
X	X	Not Applicable

Domain (default = 0)

To establish communications, all station types require the same domain number. The domain is a number between 0 and 15 with 0 being the default setting.

Recommendation

For larger wireless networks, use the domain to establish independent networks throughout your building. Only clients with the same domain as the Digital RoamAbout Access Points with which they communicate will roam from one access point to another.

Station Types Using This Parameter

Set this parameter for the station types indicated in the following table.

Master	Alternate	Station
X	X	X

Security ID

To improve the security of a wireless network, you can set a security ID. **All adapter cards must have matching security IDs in order to communicate.** You can use the RL2SETUP program to set the security ID. See Appendix B for details.

Station Types Using This Parameter

Set this parameter for the station types indicated in the following table.

Master	Alternate	Station
X	X	X

PC Card Options

Additional Parameters

The Digital RoamAbout FH/PC Card has the following additional parameters.

Use This Parameter:	For Setting:
Inactivity_min	Inactivity timeout
Inactivity_sec	Inactivity timeout
Socket	The PC Card socket where you install the RoamAbout FH network adapter card. See your PC documentation for correct socket numbering.
Initialize_365	Initialization of the Intel 365 PC Card controller chip.

Inactivity_min, Inactivity_sec

To conserve battery life, the Digital RoamAbout FH/PC Card network adapter has an inactivity sleep mode. You set the time before entering sleep mode using the `Inactivity_min` and `Inactivity_sec` parameters. The `Inactivity_min` is a number from 0-20. The `Inactivity_sec` is a number from 0-55, in increments of 5 seconds.

How Sleep Mode Works

When you set these parameters, a computer that has a Digital RoamAbout FH/PC Card network adapter installed automatically enters sleep mode when the specified period of time has elapsed since the computer sent or received data over the network. The computer calculates the time before entering sleep mode by adding the values of the `Inactivity_Min` and `Inactivity_Sec` parameters and rounding to the nearest 5-second interval.

If the computer is in sleep mode, the Master can activate it by attempting to send data to the computer. However, if the computer that is acting as the Master enters sleep mode, you lose all communication on your network. Digital recommends that you do not set an inactivity timeout on a Master.

Socket and Initialize_365

The Digital RoamAbout FH/PC Card supports computers with either Card and Socket Services V2.1 or an Intel 82365SL PC Card controller chip. The default settings for the driver is to work with Card and Socket Services. However, if this software is not detected, the driver will next look for an Intel 82365SL chip.

The `Socket` parameter sets the PC Card socket and is a value of A, B, C, or D. The `Initialize_365` parameter determines whether to set the Intel 83365SL PC Card controller chip and is a value of Y for Yes, or N for No.

5

Digital RoamAbout PATHWORKS Installation

Installing the Client Software

About the Client Driver

The NDIS software driver for PATHWORKS is provided on the Digital RoamAbout network driver disk in the NDIS directory.

Installation Procedure: PATHWORKS V5

Do the following to install the client in a PATHWORKS V5 workstation during the PATHWORKS installation.

Step	Action
1	Copy the NDIS driver file from the NDIS directory on the RoamAbout network driver disk to a directory on your workstation's hard disk.
2	Run the PATHWORKS setup program by typing one of the following: `pwsetup` (using the network) `a:\setup` (using the Setup disk)
3	When the list of NDIS drivers is displayed, select "Other".

Step	Action
4	The PATHWORKS setup program prompts you for various driver information, depending on whether you are installing PATHWORKS from the network or from the setup disk. You may be required to supply the following: • NDIS driver path – path where you copied the NDIS driver • NDIS driver file – rl2isa.dos or rl2pcm.dos • NDIS driver name – rl2isa$ or rl2pcm$ • PROTOCOL.INI stub – path where you copied the NDIS driver **PROTOCOL.INI parameters:** See the "Editing the PROTOCOL.INI File" section in this chapter.
5	Continue responding to the setup questions to complete the PATHWORKS installation.

Installation Procedure: PATHWORKS V4

Do the following to install the client in a PATHWORKS V4 workstation during the PATHWORKS installation.

Step	Action
1	Copy the NDIS driver file from the NDIS directory on the RoamAbout software driver diskette to a directory on your workstation's hard disk.
2	Run the PATHWORKS V4 setup program by typing `netsetup`
3	Select the Other NDIS driver when prompted for a driver during the PATHWORKS installation.
4	When the system prompts you for the driver, enter the path of the NDIS driver. For example: `c:\roamabt\rl2isa.dos (or rl2pcm.dos)`
5	Enter the path for the PROTOCOL.INI file. For example: `c:\roamabt\`
6	Edit the PROTOCOL.INI file to set the parameters. See the "Editing the PROTOCOL.INI File" section in this chapter.

Configuring Digital RoamAbout FH

Default Driver and Adapter Settings

Depending on how your system is set up, you might have to change the default settings that the Digital RoamAbout FH hardware and software use.

Refer to the documentation that came with your computer and peripherals to find out which settings are in use. If any settings conflict with those that the Digital RoamAbout FH use, you need to change Digital RoamAbout's Interrupt and I/O base address settings. Contact your network administrator if you are unsure about which settings to use.

Digital RoamAbout FH/ISA Default Settings

When they come from the factory, the Digital RoamAbout FH/ISA driver and adapter use the following settings:

Setting	Value
Interrupt channel	15
I/O base address (hexadecimal)	270
Channel	1
Subchannel	1
Domain	0
Station type	1
Master name	MASTER

Digital RoamAbout FH/PC Card Default Settings

When they come from the factory, the Digital RoamAbout FH/PC Card driver and adapter use the following settings:

Setting	Value
Interrupt channel	5
I/O base address (hexadecimal)	270
Memory address	D000
Channel	1
Subchannel	1
Domain	0
Station type	1
Master name	MASTER
Initialize 365	Yes
Socket	A
Inactivity min	0
Inactivity sec	30

Master Station Considerations

Consider the following when selecting a Master station during Digital RoamAbout FH configuration:

- Set at least one station on the network as the Master. If using a Digital RoamAbout Access Point, set this unit as the Master. Otherwise, use the FH/ISA as the Master as it is likely in a non-mobile computer.
- Place the Master within 300-500 feet of the other workstations on the network.

- It is a good idea to set up at least one additional station on the network as an Alternate Master. To increase performance, keep the number of Alternate Masters at a minimum. Alternate Master is the default setting for the NDIS driver.

Editing the PROTOCOL.INI File

To modify the configuration settings, you modify the contents of the PROTOCOL.INI file.

To modify the file, open it with a text editor such as NotePad and change the file contents to reflect the settings you want to use. (To be safe, always save the original version of the file under a new name.) You have to restart the network for the changes to take effect.

FH/ISA PROTOCOL.INI Default Entries

The following tables lists the default contents of the PROTOCOL.INI file for the Digital RoamAbout FH/ISA network adapter and a description of each entry.

[RL2ISA]

DriverName=rl2isa$	Network Driver.
Int=15	Sets interrupt (IRQ) channel. Valid options are 3, 4, 5, 7, 10, 11, 12, or 15.
Port=0x270	Sets the I/O base address. This port must match the DIP switch setting.
Channel=1	Sets the channel (when acting as the master). It is a number between 1 and 15.
Subchannel=1	Sets the subchannel (when acting as the master). It is a number between 1 and 15.
Domain=0	Sets the network domain. This must match the domain of the server to which you want to connect. It is a number between 0 and 15.

Station_Type=1	Sets the status of this machine as a master (2) alternate master (1) or non-master station (0).
Master_Name=MASTER	Sets this machine's name to MASTER when acting as a master or alternate master station.

FH/PC Card PROTOCOL.INI Default Entries

The following table lists the default contents of the PROTOCOL.INI file for the Digital RoamAbout FH/PC Card and a description of each entry.

[RL2PCM]	
DriverName=rl2pcm$	Network Driver
Int=5	Sets interrupt (IRQ) channel. Valid options are 3, 4, 5, 7, 10, 11, 12, or 15.
Port=0x270	Sets the I/O base address
Memory_address=0xD000	Sets the PC Card CIS memory space.
Channel=1	Sets the channel (when acting as the master). It is a number between 1 and 15.
Subchannel=1	Sets the subchannel (when acting as the master). It is a number between 1 and 15.
Domain=0	Sets the network domain. This must match the domain of the server to which you want to connect. It is a number between 0 and 15.
Station_Type=1	Sets the status of this machine as master (2), alternate master (1), or non-master station (0).
Master_Name=Master	Sets this machine's name to MASTER when acting as a master or alternate master station
Socket=A	Sets the PC Card socket. Valid options are A, B, C, or D.
Initialize_365=Y	Determines whether to set the Intel 365 PC Card controller chip.

Inactivity_min=0	Sets the amount of inactivity time in minutes before which the driver puts the station to sleep. It is a number between 0 and 20.
Inactivity_sec=30	Sets the amount of inactivity time in seconds before which the driver puts the station into sleep mode. It is a number between 0 and 55, in increments of 5.

6

Digital RoamAbout NetWare Installation

Loading the Server Driver

About the Server Driver

Digital provides a standard IEEE Ethernet-compliant server driver that runs on a NetWare 4.X or 3.1X server.

When to Load The Server Driver

When installing the Digital RoamAbout FH/ISA network adapter into a NetWare environment, you need to install the server drivers. Use the load command to load these drivers.

If you are installing a Digital RoamAbout FH/PC Card network adapter, you do not install the server driver.

Load Command Syntax

Use the following syntax for the load command when loading the server driver (enter the command on one line).

```
load rl2isa int=I port=PPP channel=C
subchannel=S domain=D station_type=T
master_name=M frame=ethernet_802.3
```

Optional Arguments

All load command arguments except PORT and INT are optional. If you do not specify them, the default values take effect.

Load Command Arguments

The following table describes the values you can specify for each load command argument:

This Argument:	Specifies:
`int=I`	The hex number of the interrupt line that you intend to use. Valid choices are 3, 4, 5, 7, A (for interrupt 10), B (for 11), C (for 12) and F (for 15). **Default Value:** The default value is F.
`port=PPP`	The 3-digit hex I/O port address that you previously set using the RoamAbout FH/ISA card's DIP switch. **Default Value:** The default value is 270.
`channel=C`	The channel the RoamAbout network adapter uses when it is acting as a Master or Alternate Master. The parameter must have a value between 1 and 15. Do not set this parameter for Stations. **Default Value:** The default value is 1.
`subchannel=S`	The subchannel the RoamAbout uses when it is acting as a Master or Alternate Master. This parameter must have a value between 1 and 15. It is only active if the `station_type` parameter is set to 2 or 1. **Default Value:** The default value is 1.
`domain=D`	The RoamAbout network domain, which is a number between 0 and 15. **Default Value:** The default value is 0.
`station type=T`	The type of station in which the RoamAbout FH/ISA is installed. The server can be a Master (=2), Alternate Master (=1), or non-master station (=0). In general, you want your server to be the Master , however, when using a RoamAbout Access Point, set the server to be an Alternate Master. **Default Value:** The default value is 2.

This Argument:	Specifies:
`master_name=M`	Names the station. This parameter is only needed if station_type is set to 2 or 1. The name may be up to 11 characters long. **Default Value:** The default value is no name.
`frame= Ethernet_802.3`	Indicates that RoamAbout sends Ethernet packets that follow the 802.3 specification.

Load Command Example

An example load command is (when you type this command , type it as one line):

```
load rl2isa int=f port=270 channel=3
subchannel=1 domain=9 station_type=2
master_name=Digital frame=ethernet_802.3
```

Command Description

This command loads the Digital RoamAbout server driver with the interrupt line set to Fh (15 decimal), I/O port set to 270h, the channel set to 3, the subchannel set to 1, the domain set to 9, and the server configured as a master that is named Digital.

Installing Digital RoamAbout FH/ISA in a NetWare 4.X or 3.12 Server

Installation Procedure

Do the following to install the Digital RoamAbout FH/ISA network adapter into a NetWare 4.X or 3.12 server.

Step	Action
1	Set the DIP switch setting, if necessary. Normally the default setting of I/O address 270 can accommodate your environment. If you need to make a change, see Appendix A of this book.
2	Shut down your NetWare server and install the RoamAbout FH/ISA adapter card into any available slot in the server.
3	Connect the custom antenna cable to the threaded connector of the RoamAbout FH/ISA.
5	Boot the server as you normally would.
4	Copy the RoamAbout driver file RL2ISA.LAN from the NWSERVER subdirectory on the RoamAbout network driver disk to either: • Your NetWare server boot disk (if you normally boot your server from a floppy) • The DOS partition on your server's hard disk • The SYSTEM volume from a workstation
6	When NetWare has booted, go to the System Console mode.
7	At the System Console prompt, load the RoamAbout FH/ISA driver from your boot floppy disk OR the server hard disk (depending on the method that you used in Step 4 above) by typing : `load rl2isa int=I port=PPP channel=C subchannel=S domain=D station_type=T master_name=M frame=ethernet_802.3` **Command Description:** See the previous “Load Command” section for a description of each command argument.

Step	Action
8	Bind the IPX protocol stack to your RoamAbout software using the following command: `bind ipx rl2isa net=N` **Command Description:** *N* refers to the NetWare subnet ID that you assign to the RoamAbout card and its subnet (see NetWare documentation for subnet details).

9	If you want the RoamAbout driver to load automatically whenever the server is booted, edit the server's AUTOEXEC.NCF file. Do the following:
	a) Type `load install` at the System Console prompt to bring up the Installation Options menu.
	b) Select System Options from this menu,
	c) Select Edit AUTOEXEC.NCF from the Available System Options menu. The system displays the server's AUTOEXEC.NCF file.
	d) Use the arrow keys to bring the cursor to a blank line in the AUTOEXEC.NCF.
	e) Add the following lines to the file:
	`load rl2isa int=I port=PPP channel=C subchannel=S domain=D station_type=T master_name=M frame=ethernet_802.3`
	
	`bind ipx rl2isa net = N`
	
	Argument Descriptions: See the previous “Load Command” section for descriptions of the load command arguments. See Step 8 for a description of the bind argument.

Installing Digital RoamAbout FH/ISA in a NetWare 3.11 Server

Installation Procedure

Do the following to install Digital RoamAbout FH/ISA into a NetWare 3.11 server.

Step	Action
1	Set the DIP switch, if necessary. Normally the default setting of I/O address 270 can accommodate your environment. If you need to make a change, see Appendix A of this manual.
2	Shut down your NetWare server and install the RoamAbout FH/ISA adapter card into any available slot in the server.
3	Connect the custom antenna cable to the threaded connector of the RoamAbout FH/ISA.
4	Boot up the server as you normally would.
5	Copy the RoamAbout driver file “RL2ISA.LAN” from the NWSERVER.311 subdirectory on the RoamAbout network driver disk to one of the following: • NetWare server boot disk (if you normally boot your server from a floppy) • The DOS partition on your server's hard disk • The SYSTEM volume from a workstation
6	Copy the following files to the same place in which you copied the RL2ISA.LAN file: • LSLENH.NLM • PATCHMAN.NLM • MSM31X.NLM • ETHERTSM.NLM
7	Replace the MONITOR.NLM file in the SYSTEM volume of the server with the MONITOR.NLM file that is supplied on the RoamAbout driver diskette (the NetWare 3.11 diagnostic table is different than the NetWare 4.X diagnostic table). This change does not affect anything else on your network or the way you use MONITOR.
8	When NetWare has booted, go to the System Console mode.

Step	Action

9	Load LSLENH, PATCHMAN, MSM31X, and ETHERTSM at the prompt. Type the following:
	`load lslenh`
	`load patchman`
	`load msm31x`
	`load ethertsm`

10	At the System Console prompt, load the RoamAbout FH/ISA driver from your boot floppy disk OR the server hard disk (depending on the method that you used in Step 4 above) by typing: `load rl2isa int=`*`I`* `port=`*`PPP`* `channel=`*`C`* `subchannel=`*`S`* `domain=`*`D`* `station_type=`*`T`* `master_name=`*`M`* `frame=ethernet_802.3` **Command Description:** See the previous “Load Command” section for descriptions of the load command arguments.
11	Bind the IPX protocol stack to your RoamAbout software using the following command: `bind ipx rl2isa net=`*`N`* **Variable Description:** *N* refers to the NetWare subnet ID that you assign to the RoamAbout card and its subnet (see NetWare documentation for subnet details).

Step	Action

12	To make the RoamAbout driver load automatically whenever the server is booted, edit the server's AUTOEXEC.NCF file. Do the following:
	a) Type load install at the System Console prompt to bring up the Installation Options menu.
	b) Select System Options from this menu.
	c) Select Edit AUTOEXEC.NCF from the Available System Options menu. The system will display the server's AUTOEXEC.NCF file.
	d) Use the arrow keys to bring the cursor to a blank line in the AUTOEXEC.NCF.
	e) Add the following lines to the file:
	`load lslenh`
	`load patchman`
	`load msm31x`
	`load ethertsm`
	`load rl2isa int=`*`I`* `port=`*`PPP`* `channel=`*`C`* `subchannel=`*`S`* `domain = `*`D`* `station_type=`*`T`* `master_name=`*`M`* `frame=ethernet_802.3`
	`bind ipx rl2isa net = `*`N`*
	Command Argument Descriptions: See the previous “Load Command” section for descriptions of the load command arguments. See Step 11 in this procedure for a description of the bind argument.

Installing the NetWare Client

About the Client Driver

Digital RoamAbout uses a standard ODI driver at the client. You can find this driver on the Digital RoamAbout network driver disk in the DOSODI directory.

Installation Procedure for NetWare V4

Do the following to install the Digital RoamAbout FH/ISA or FH/PC Card client software in a NetWare V4 environment.

Step	Action
1	Insert the NetWare V4WSDOS diskette in drive A and type `a:install`.
2	Step 4 of the NetWare V4 installation prompts you to insert the OEM-supplied disketted. Insert the RoamAbout software driver diskette in Drive A and press Return.
3	Select the appropriate driver (FH/ISA or FH/PC Card) from the Drivers list and press Return.
4	Select the appropriate Media Frame Type for your network. The default is Ethernet 802.3. Be sure to select the correct protocol; your network may be running 802.2 or Ethernet II.
5	When prompted, place the NetWare Program diskette in drive A and press Return.

6	Continue with the NetWare V4 installation until the installation is complete. The installation creates a NETSTART file that loads the drivers in the following order:
	`lsl`
	`rl2isa` (or `rl2pcm` for PC Cards)
	`ipxodi`
	`vlm`
	`login`

7	If you need to change the RoamAbout FH/ISA or PC Card hardware or software settings, go to the next section. Otherwise you are finished with installing the NetWare client software.

Installation Procedure for NetWare V3

Do the following to install the Digital RoamAbout FH/ISA or FH/PC Card client software in a NetWare V3 environment.

Step	Action
1	Copy the files from the DOSODI directory to a directory on your workstation's hard disk or boot floppy disk.

2	Run the files in the following order to load the driver and attach to the network:
	`c:\nwclient> lsl`
	`c:\nwclient> rl2isa` (or `rl2pcm` for PC Cards)
	`c:\nwclient> ipxodi`
	`c:\nwclient> vlm`
	`c:\nwclient> login`

Notes

- Novell provides the files IPXODI, VLM, and LOGIN in the NetWare client software package.
- If you use VLM on a NetWare 3.11 network, you may want to also load Novell's PBURST.NLM on the file server for increased performance.

For FH/PC Card Users

You must install a Digital RoamAbout FH/PC Card network adapter in the file server or attach a Digital RoamAbout Access Point to your network in addition to installing the Digital RoamAbout FH/PC Card in the client.

Verifying the Network Connection

After installing the appropriate network driver, verify the wireless network connection by accessing services on your network. For example, you can copy a file from a server to your computer.

Changing Digital RoamAbout Client Configuration

Factory Default Settings

Depending on how your network is configured, you might have to change the default settings that the Digital RoamAbout FH hardware and software use.

Digital RoamAbout FH/ISA Settings

The following software driver and adapter settings are the factory defaults for the Digital RoamAbout FH/ISA product:

Setting	Value
Int	15
Port	270
Domain	0
Station_type	0
Frame	ethernet_802.3

Digital RoamAbout FH/PC Card Settings

The following software driver and adapter settings are the factory defaults:

Setting	Value
Int	5
Port	270
Memory_address	D000
Domain	0
Station_type	0
Frame	ethernet_802.3
Socket	A
Initialize_365	Y
Inactivity_min	0
Inactivity_sec	30

Changing Settings

Refer to the documentation that came with your computer and the products you use with it to find out which I/O base address and interrupt settings are in use. If any settings conflict with those that the Digital RoamAbout FH network adapter use, you need to change the Digital RoamAbout FH network adapter settings. Contact your network administrator if you are unsure about which settings to use.

Do the following to change the Digital RoamAbout FH settings.

Step	Action
1	Edit the contents of the NET.CFG file you copied into the Novell directory. **Editors:** You can use a text editor such as EDLIN or DOS 5.0 and 6.0 EDIT to modify the file contents. (Always save the original version of the file under a new name.)
2	After modifying and saving the NET.CFG file, unload the drivers in reverse load order by typing in the name of the driver with a U parameter afterwards. **Example**: To unload RL2ISA, type RL2ISA U.
3	Reload all the drivers starting with LSL. **If FH/ISA I/O Base Address Changed:** If you change the I/O base address (port) for the RoamAbout FH/ISA product, you also need to change the hardware DIP switch on the adapter card. See Appendix A for more details.

FH/ISA NET.CFG File Example

The following example shows the default contents of the NET.CFG file for the Digital RoamAbout FH/ISA and explains each entry.

LINK DRIVER RL2ISA

int	15	; Sets interrupt (IRQ) channel. Valid options are 3, 4, 5, 7, 10, 11, 12, or 15.
port	270	; Sets the I/O base address. This port must match the DIP switch setting.
domain	0	; Sets the network domain. This must match the domain of the server to which you want to connect.
station_type	0	; Sets the status of the RoamAbout FH/ISA card as a master (2), alternate master (1) or non-master station.
frame	ethernet=802.3	; Indicates that RoamAbout sends Ethernet packets that follow the 802.3 specification.
channel	1	; Sets the channel to be used when this station is acting as the master. It is a number between 1 and 15.

FH/PC Card NET.CFG File Example

The following example shows the default contents of the Digital RoamAbout FH/PC Card NET.CFG file and explains each entry.

LINK DRIVER RL2PCM

int	5	; Sets interrupt (IRQ) channel. Valid options are 3, 4, 5, 7, 10, 11, 12, or 15.
port	270	; Sets the I/O base address.
mem #1	D000	; Sets the PC Card CIS memory space.
domain	0	; Sets the network domain. This must match the domain of the server to which you want to connect. It is a number between 0 and 15.
station_type	0	; Sets the status of the RoamAbout FH/PC Card as a master (2), alternate master (1), or non-master station (0).
frame	ethernet_802.3	; Indicates that RoamAbout sends Ethernet packets that follow the 802.3 specification.
socket	A	; Sets the PC Card socket. Valid options are A, B, C, or D.
initialize_365	Y	; Determines whether to initialize the Intel 365 PC Card controller chip.
inactivity_min	0	; Sets the amount of inactivity time in minutes before which the driver puts the station to sleep. It is a number between 0 and 20.
inactivity_sec	30	; Sets the amount of activity time in seconds before which the driver puts the station to sleep. It is a number between 0 and 55, in increments of 5.

Changing a Non-Master Station to a Master

In general, you set your NetWare workstations as non-master stations. The Digital RoamAbout Access Point or the NetWare server acts as the master. If you want a non-master station to act as the master or alternate master, change the `station_type` parameter in the NET.CFG file to 1 or 2 and add the following parameters.

Parameter	Value	Description
channel	*1*	Sets the channel to be used when this station acts as the master. It is a number between 1 and 15.
subchannel	*1*	Sets the subchannel to be used when this station is acting as the master. It is a number between 1 and 15.
master_name	*NAME*	Sets the name of this machine when it is acting as a master station. The NAME may be up to 11 characters in length.

7

Digital RoamAbout Personal NetWare Installation

Installing the Software

Master Station Considerations

Consider the following when you install the software:

- Set at least one station on the network as the Master. Set the Digital RoamAbout Access Point as the Master. If not using a Digital RoamAbout Access Point, use the Digital RoamAbout FH/ISA as the Master since it is likely to be in a non-mobile computer.
- Place the Master within 300-500 feet of the other workstations on the network.
- It is a good idea to also set up at least one additional station on the network as an Alternate Master. To increase performance, keep the number of Alternate Masters at a minimum. Alternate Master is the default setting for the Personal NetWare driver.

- When you configure the Digital RoamAbout FH adapter as a Master or Alternate Master, set the `channel`, `subchannel` and `master_name` parameters during the software installation or by editing the NET.CFG file.
- When you configure Digital RoamAbout FH network adapter as a non-master station, you do not need to set the `channel`, `subchannel`, or `master_name` parameters.
- **For FH/PC Card users:** If the station where you install the Digital RoamAbout FH/PC Card acts as a server on the network, Digital recommends that you do not set the `inactivity_min` and `inactivity_sec` parameters. If you do set these parameters, the machine may be in sleep mode when another user tries to access it.

For More Information

- See Chapter 3 for a list of all the possible values for the different settings.
- See “ Modifying the NET.CFG File ” in this chapter for information about the NET.CFG file.

Installation Procedure

Digital RoamAbout FH requires that another member of the Digital RoamAbout family be installed and functional in an additional workstation on the network before you can make a wireless connection.

Do the following to install Digital RoamAbout FH in a Personal NetWare network.

Step	Action
1	Follow the instructions in your Novell Personal NetWare user's manual. During installation, you will see a dialogue box that asks you to pick a Network Interface Card and Driver from a list. Select "OEM supplied driver" from the dialogue box.
2	You are prompted for the disk containing the driver for RoamAbout. Insert the RoamAbout network driver disk. Depending on the adapter you are using, either the Digital RoamAbout FH/ISA or FH/PC Card adapter is selected. Continue with the Personal NetWare installation.
3	When you are prompted to configure the NetWare Interface Card, choose an interrupt and I/O base address that do not conflict with other cards in your computer. **For FH/ISA Users:** The I/O base address that you select must match the DIP switch settings of your RoamAbout FH/ISA. See Appendix A of this manual to set the DIP switch settings. **For FH/PC Card Users:** The installation procedure also prompts you to choose a memory window.
4	If required, set the RoamAbout parameters of Channel, Subchannel, and Domain. If using a RoamAbout FH/PC Card, you can also set the Socket, Initialize_365, Inactivity_min and Inactivity_sec parameters. For descriptions of these parameters, see "Digital RoamAbout Software Parameters" in Chapter 3. After making any necessary changes to the options, continue with the installation.
5	After you install the software from the Personal NetWare diskettes, the procedure prompts you to insert the third party supplied driver file. Insert the RoamAbout network driver disk and continue.

Modifying the NET.CFG File

About the NET.CFG File

After installation, the Digital RoamAbout FH client driver is installed and automatically loaded. The Digital RoamAbout FH client driver requires a NET.CFG configuration file that resides in the Personal NetWare directory. This is an ASCII text file that you can edit with any text editor.

Sample FH/ISA NET.CFG File

The following is an example of a NET.CFG file for the Digital RoamAbout FH/ISA with default entries and descriptions of the entries.

LINK DRIVER RL2ISA

int	15	Sets interrupt (IRQ) channel. Valid options are 3, 4, 5, 7, 10, 11, 12, or 15.
port	270	Sets the I/O base address. This port must match the DIP switch setting.
domain	0	Sets the network domain. This must match the domain of the server to which you want to connect. It is a number between 0 and 15.
station_type	1	Sets the status of the RoamAbout FH/ISA as a master (2), alternate master (1) or non-master station (0).
frame	ethernet_802.3	The frame line indicates that RoamAbout sends Ethernet packets that follow the 802.3 specification.

channel	1	Sets the channel to be used when this station is acting as the master. It is a number between 1 and 15.
subchannel	1	Sets the subchannel to be used when this station is acting as the master. It is a number between 1 and 15.
master_name	MASTER	Sets the name of this machine to MASTER when it is acting as a master station. The NAME may be up to 11 characters in length.

Sample FH/PC Card NET.CFG File

The following is an example of a NET.CFG file for the Digital RoamAbout FH/PC Card with default entries and descriptions of the entries.

LINK DRIVER RL2PCM

int	5	Sets interrupt (IRQ) channel. Valid options are 3, 4, 5, 7, 10, 11, 12, or 15.
port	270	Sets the I/O base address.
mem #1	D000	Sets the PC Card CIS memory space.
domain	0	Sets the network domain. This must match the domain of the server to which you want to connect. It is a number between 0 and 15.
frame	ethernet_802.3	The frame line indicates that RoamAbout sends Ethernet packets that follow the 802.3 specification.
station_type	1	Sets the status of the RoamAbout FH/PC CARD as a master (2), alternate master (1), or non-master station (0).

channel	1	Sets the channel to be used when this station is acting as the master. It is a number between 1 and 15.
subchannel	1	Sets the subchannel to be used when this station is acting as the master. It is a number between 1 and 15.
master_name	MASTER	Sets the name of this machine to MASTER when it is acting as a master station. The NAME may be up to 11 characters in length.
socket	A	Sets the PC Card socket in which the RoamAbout FH PC Card is installed. Valid options are A, B, C, or D.
initialize_365	Y	Determines whether to initialize the Intel 365 PC Card controller chip.
inactivity_min	0	Sets the amount of inactivity time in minutes before which the driver puts the station to sleep. It is a number between 0 and 20.
inactivity_sec	30	Sets the amount of inactivity time in seconds before which the driver puts the station to sleep. It is a number between 0 and 55, in increments of 5.

8

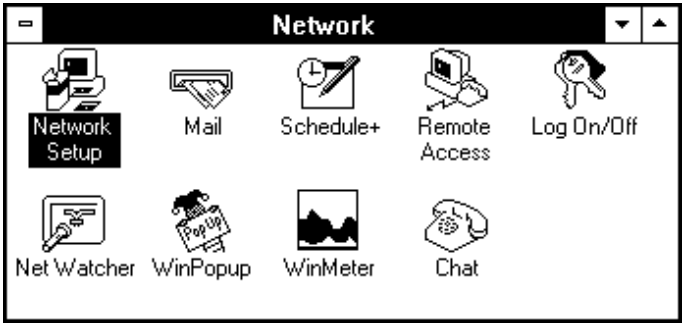
Digital RoamAbout Windows for Workgroups Installation

Installing the Software

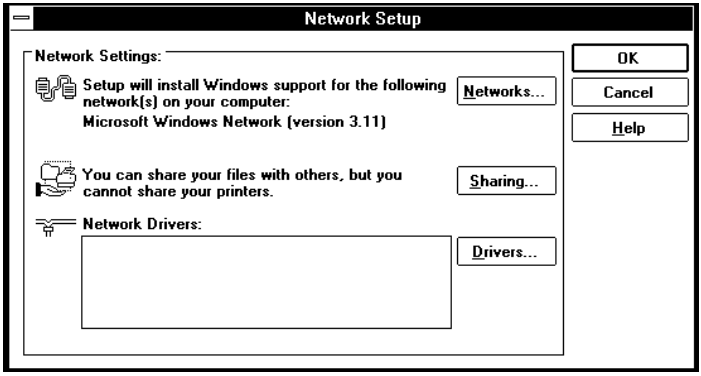
Installation Procedure

The NDIS software driver for Windows for Workgroups is provided on the Network Drivers' disk. To install the software, make sure Windows for Workgroups is running and do the following steps .

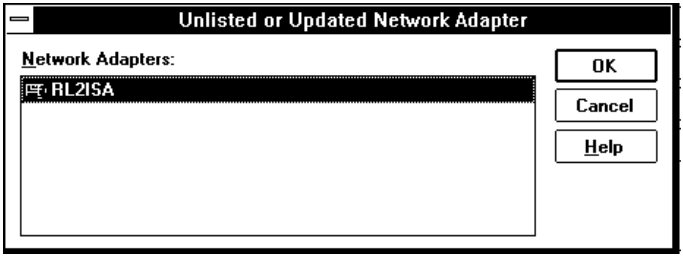
Step	Action
1	Open the Network Setup icon from the Network group.



2	The Network Setup window appears. Choose the Drivers button.



3	The Network Drivers dialog box appears, displaying options for network drivers to be used on your network. If no other network adapters are installed, the dialog box does not list any adapters. Choose the Add Adapter button.
4	The Add Network Adapter dialog box appears. Choose Unlisted or Updated Network Adapter from the list.

Step	Action
5	The Install Driver dialog box appears, prompting you to insert a disk containing the network drivers you want to install. If the dialog box lists the wrong drive letter in the entry area, delete it and type the correct drive letter. For example, if the dialog box lists drive A and you are using drive B, change the entry. Insert the RoamAbout network driver disk which contains the NDIS driver into the appropriate floppy drive and click OK.
6	The Unlisted or Updated Network Adapter dialog box appears displaying the FH/ISA or FH/PC Card driver. Click OK to continue. 
7	Windows for Workgroups installs the NDIS driver, and then returns to the Network Drivers dialog box displaying the current driver settings.

If you think you need to change the default settings (because of a potential conflict between Digital RoamAbout FH's default settings and the settings that another product on your computer uses, for example), continue with the next section, "Configuring Digital RoamAbout FH."

Configuring Digital RoamAbout FH

Default Driver and Adapter Settings

Depending on how your system is set up, you might have to change the default settings that the Digital RoamAbout FH hardware and software use.

Refer to the documentation that came with your computer and peripherals to find out which settings are in use. If any settings conflict with those that the Digital RoamAbout FH use, you need to change Digital RoamAbout's Interrupt and I/O base address settings. Contact your network administrator if you are unsure about which settings to use.

Digital RoamAbout FH/ISA Default Settings

When they come from the factory, the Digital RoamAbout FH/ISA driver and adapter use the following settings:

Setting	Value
Interrupt channel	15
I/O base address (hexadecimal)	270
Channel	1
Subchannel	1
Domain	0
Station type	1
Master name	

Digital RoamAbout FH/PC Card Default Settings

When they come from the factory, the Digital RoamAbout FH/PC Card driver and adapter use the following settings.

Setting	Value
Interrupt channel	5
I/O base address (hexadecimal)	270
Memory address	D000
Channel	1
Subchannel	1
Domain	0
Station type	1
Master name	MASTER
Initialize 365	Yes
Socket	A
Inactivity min	0
Inactivity sec	30

Master Station Considerations

Consider the following when selecting a Master Station during Digital RoamAbout FH/ISA configuration:

- Set at least one station on the network as the Master. If using a Digital RoamAbout Access Point, set it as the Master. Otherwise, use the Digital RoamAbout FH/ISA network adapter since it is likely to be in a non-mobile computer.
- Place the Master within 300-500 feet of the other workstations on the network.

- It is a good idea to set up at least one additional station on the network as an Alternate Master. To increase performance, keep the number of Alternate Masters at a minimum. Alternate Master is the default setting for the Windows for Workgroups driver.

Configuration Procedure

Additional Configuration Method

In addition to the method shown in this section, you can set configuration options by modifying the Windows PROTOCOL.INI file. See the section entitled “Modifying the Windows for Workgroups PROTOCOL.INI File” for details.

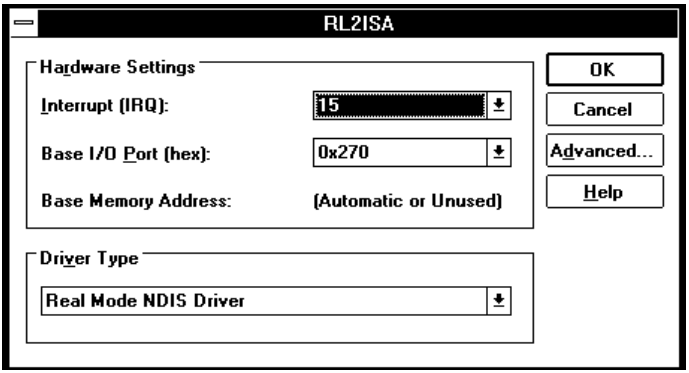
Note

Depending on which adapter you use, the windows shown in this section may vary from those that appear on your screen.

Steps

Do the following to configure the Digital RoamAbout FH using the RL2SETUP program.

Step	Action
1	The Network Drivers dialog box should be displayed with the Digital RoamAbout FH/ISA or FH/PC Card driver selected. Choose the Setup button. **For More Information:** See “Installing the RoamAbout Software for Windows for Workgroups” earlier in this chapter for information about opening the dialog box.
2	The Digital RoamAbout FH/ISA or FH/PC Card dialog box appears displaying the default hardware settings. **To Change the Interrupt Channel:** Type a new value or choose a value from the Interrupt (IRQ) pull-down menu.

Step	Action
	
	To Change the I/O Base Address: Type a new value or choose a value from Base I/O Port pull-down menu. Enter the address in hexadecimal notation. **For FH/ISA Users:** You need to change the DIP switch to match the setting you choose here. See Appendix A for a list of possible addresses.
3	The new values appear in the dialog box. If you need to change the other settings, click the Advanced button. The Digital RoamAbout FH/ ISA or FH/PC Card dialog box now displays a list of advanced settings.
4	Change the desired options by selecting them one at a time in the list, then entering a new value or choosing a value from the pull-down menu at the bottom of the dialog box.
5	Check to make sure you made all of the needed option changes. Click OK.
6	The original Digital RoamAbout FH/ISA or FH/PC Card dialog box reappears. Continue with the next section “Accepting the Configuration” to complete the software installation.

Accepting the Configuration

If you want to use the default settings for the network adapter or you have changed the settings, you can now accept the configuration and restart your computer.

Do the following to accept the configuration.

Step	Action
1	The Digital RoamAbout FH/ISA or FH/PC Card dialog box should be displayed. Click OK to complete the configuration.
2	The Network Drivers dialog box reappears. Click Close.
3	The Network Setup dialog box reappears. Click OK.
	After copying the RoamAbout FH drivers, a dialog box appears, informing you that Windows Setup has modified your AUTOEXEC.BAT, SYSTEM.INI and PROTOCOL.INI files and retained the previous versions of the file under new names. Click OK.
4	A dialog box appears, prompting you to quit Windows and restart your computer. Click Restart Computer.
5	After restarting, your computer will be properly configured for wireless communication with other devices fitted with RoamAbout units.

Verifying the Network Connection

After installing the network driver, you can verify the wireless network connection by accessing services on your network. For example, you can copy a file from a computer on the network to your computer.

Modifying Configuration Settings

How To Modify Settings

You can modify configuration settings in either of the following ways:

- In Windows for Workgroups, use the Network Setup dialog box (accessible through the Network Control Panel). See “Configuring Digital RoamAbout FH” earlier in this chapter for information.
- Modify the contents of the PROTOCOL.INI file.

  To modify the file, open it with a text editor such as NotePad and change the file contents to reflect the settings you want to use. (To be safe, always save the original version of the file under a new name.) You have to restart the computer for the changes to take effect.

FH/ISA PROTOCOL.INI Default Entries

The following tables lists the default contents of the PROTOCOL.INI file for the Digital RoamAbout FH/ISA network adapter and a description of each entry.

[RL2ISA]

DriverName=rl2isa$	Network Driver
Int=15	Sets interrupt (IRQ) channel. Valid options are 3, 4, 5, 7, 10, 11, 12, or 15.
Port=0x270	Sets the I/O base address. This port must match the DIP switch setting.
Channel=1	Sets the channel (when acting as the master). It is a number between 1 and 15.
Subchannel=1	Sets the subchannel (when acting as the master). It is a number between 1 and 15.
Domain=0	Sets the network domain. This must match the domain of the server to which you want to connect. It is a number between 0 and 15.

Station_Type=1	Sets this machine as a master (2), alternate master (1), or a non-master station (0).
Master_Name=MASTER	Sets this machine's name to MASTER when acting as a master or alternate master station. The name can be up to 11 characters in length.

FH/PC Card PROTOCOL.INI Default Entries

The following table lists the default contents of the PROTOCOL.INI file for the Digital RoamAbout FH/PC Card and a description of each entry.

[RL2PCM]

DriverName=rl2pcm$	Network Driver
Int=5	Sets interrupt (IRQ) channel. Valid options are 3, 4, 5, 7, 10, 11, 12, or 15.
Port=0x270	Sets the I/O base address.
Memory_address=0xD000	Sets the PC Card CIS memory space.
Channel=1	Sets the channel (when acting as the master). It is a number between 1 and 15.
Subchannel=1	Sets the subchannel (when acting as the master). It is a number between 1 and 15.
Domain=0	Sets the network domain. This must match the domain of the server to which you want to connect. It is a number between 0 and 15.
Station_Type=1	Sets this machine as a master (2), alternate master (1), or non-master station (0).
Master_Name=MASTER	Sets this machine's name to MASTER when acting as a master or alternate master station. The name can be up to 11 characters in length.
Socket=A	Sets the PC Card socket in which the RoamAbout FH/PC Card is installed. Valid options are A, B, C, or D.

Initialize_365=Y	Determines whether to set the Intel 365 PC Card controller chip.
Inactivity_min=0	Sets the amount of inactivity time in minutes before which the driver puts the station to sleep. It is a number between 0 and 20.
Inactivity_sec=30	Sets the amount of inactivity time in minutes before which the driver puts the station into sleep mode. It is a number between 0 and 55, in increments of 5.

9

Improving Performance

Performance Hints

Introduction

This section describes some methods to increase performance on a wireless network.

The Digital RoamAbout FH products are designed to be very easy to install and operate. If you do experience difficulties, however, use the information in this chapter to help diagnose and solve the problem. If you cannot resolve the problem, contact your reseller or Digital customer service representative. See Appendix D for a list of country-specific telephone numbers.

Running Large Executable Files Efficiently

Certain executable files like Novell's LOGIN program can take a long time to start up.

Performance Tip

You can make this more efficient if you copy the file to your local hard disk. This way you only access the server to read data files, which allows for better performance.

Novell's VLM Technology

The Digital RoamAbout FH/ISA ODI driver supports Novell's new VLM technology. It is the new standard interface for NetWare 3.x, 4.x, and Personal NetWare clients.

Performance Tips

If you use VLM.EXE instead of NETX.EXE when attaching a NetWare 3.x, 4.x, or Personal NetWare client, you can achieve greater performance by up to 82% according to Novell's Systems Research Department tests.

On a NetWare 3.11 server, you must load PBURST.NLM in order for the VLM technology's performance enhancements to take effect.

Network Performance

Microwave ovens operate in the same frequency band as Digital RoamAbout FH products. Therefore, if you use a microwave within range of Digital RoamAbout FH, the microwave oven can cause some network performance degradation. However, both your microwave and your Digital RoamAbout network will continue to function.

Performance Tip

Consider moving your microwave oven to a site where it is beyond the range of your Digital RoamAbout FH units.

Antenna and Radio Module Placement

Proper antenna or radio module placement can help improve Digital RoamAbout performance.

Performance Tips

- Consider the following for the Digital RoamAbout FH/ISA antenna:
  - Try to place the Digital RoamAbout FH/ISA antenna as high as possible in an office environment above cubicle walls.
  - Try not to place a sheet of metal between two antennas.
  - Two antennas that are communicating should be in the same plane. For example, do not lie one antenna on its side and have its partner standing upright.
- Try to place the Digital RoamAbout FH/PC Card radio module so that it extends above the top of the computer.

Master and Alternate Master Performance

About Spread Spectrum Frequency Hopping

Digital RoamAbout uses a spread spectrum frequency hopping technique. This means that the radio signal is constantly moving from one frequency to another in a pre-defined sequence. In order for several Digital RoamAbout radios to communicate, they must be at the same frequency at the same time.

How Digital RoamAbout Radios Communicate

Digital RoamAbout uses a method whereby one unit, called the Master, sets the pace for the other radios. All stations look to the Master to determine where and when to hop. If there is no Master present, a station configured as an Alternate Master will decide to become the Master for that session.

This configuration leaves the system administrator for the network with the task of configuring each wireless station on the network as Master, Alternate Master, or just a station. In most cases, using the default configurations for each of the drivers will work fine.

Configuration Considerations

There may be times when the system administrator wants to change the configuration for performance, or other issues. Consider the following:

- In every wireless Digital RoamAbout network, at most one station must act as the Master. In most configurations, your Digital RoamAbout Access Point should be the Master. If your network has only wireless components, the server should be the Master.
- If you need to set up additional Masters, configure them as Alternate Masters so that there is only one true Master on the network.

- The Master must be within range of the other wireless stations on the network. The Master should not be a station which will be moved or turned off like a notebook computer or a user's personal machine.
- On a server-client based network, it usually makes sense for the server to be the Master.
- On a peer-to-peer based network, it is probably a good idea to designate at least one computer as an Alternate Master in the event that the Master is unavailable.
- On a network with all notebook or pen-based computers, it may be advisable for all machines to be Alternate Master.

10
Troubleshooting

General Problems

Additional Product Information

If additional information becomes available after the printing of this manual, there will be a README file on the distribution disk included in your product package.

Mismatched Domains and Security IDs

If you are able to get the software driver to load successfully, but cannot communicate with another machine on the network, it is possible that you do not have the same domain and security ID as on the other machine.

Out Of Range Problems

If your two Digital RoamAbout FH adapters are not within range, you will be unable to establish reliable communication.

Roaming Problems

If a client station appears to be having problems roaming, the station may be incorrectly configured as a Master. Check the `station_type` parameter setting in the NET.CFG or PROTOCOL.INI file and change it, if necessary.

Wrong Frame Type

If you are able to load the Digital RoamAbout driver on both a NetWare server and a workstation, but they do not communicate, they may be using different frame types. Verify they are both set to the same frame type. For example, you may need to add the line FRAME=ETHERNET_II to the NET.CFG file. Or, you may need to specify a different frame type on the NetWare file server with the line FRAME=ETHERNET_802.3.

Digital RoamAbout FH/ISA Problems

Invalid Software Parameter Settings

Make sure that the options you selected are valid. The following table lists these options.

Parameter	Valid Options
IRQ	3, 4, 5, 7, 10, 11, 12, 15
I/O Address	100, 120, 140, 218, 270, 280, 290, 298, 2A0, 2A8, 2E0, 300, 310, 358, 360, 368
Channel	1-15
Subchannel	1-15
Domain	0-15

IRQ or I/O Base Address Conflicts.

You can use the RL2SETUP program to verify that there are no hardware conflicts between your Digital RoamAbout FH/ISA card and other peripheral devices in your computer.

Mismatched Software and Hardware Settings

See Appendix A of this manual to verify your DIP switch setting. Make sure that it matches the options you selected in your software driver.

Digital RoamAbout FH/PC Card Problems

Card and Socket Services

To run with a Digital RoamAbout FH/PC Card, your computer must have either an Intel 82365SL controller chip or Card and Socket Services software revision 2.1

Invalid Software Parameter Settings

Make sure that the options you selected are valid. The following table lists these options.

Parameter	Valid Options
Int	3, 4, 5, 7, 10, 11, 12, 15
Port	100, 120, 140, 218, 270, 280, 290, 298, 2A0, 2A8, 2E0, 300, 310, 358, 360, 368
Memory	A000-FF00
Channel	1-15
Subchannel	1-15
Domain	0-15
Socket	A,B,C,D
Inactivity Min	0-20
Inactivity Sec	0-55 (in increments of 5 seconds)

Hexadecimal Port and Memory Addresses

Memory and port addresses are in hexadecimal formats. In the PROTOCOL.INI file, these values have a prefix of 0x. For example:

```
Memory_Address = 0xD000
Port = 0x270
```

In the NET.CFG file, you do not need the the 0x prefix. For example:

```
mem #1 D000
port 270
```

IRQ or I/O Base Address and Memory Address Conflicts

You can use the <Test/Utilities> option in the RL2SETUP program to verify that there are no hardware conflicts between your Digital RoamAbout FH/PC Card adapter and other peripheral devices in your computer. If you are using an expanded memory manager such as Microsoft's EMM386 or Quarterdeck's QEMM, you have to exclude the region in memory that the Digital RoamAbout PC Card uses.

For EMM386 Users

If the Digital RoamAbout FH/PC Card is using memory space D000 (the default) and EMM386 is your memory manager, you need to exclude the region D000-D3FF when the memory manager loads in your CONFIG.SYS file with the parameter x=D000-D3FF. For more information on this parameter, see the manual that came with your expanded memory manager.

For Windows for Workgroups Users

If you are using Windows for Workgroups, you also need to set the EMMExclude parameter in Window's SYSTEM.INI file to exclude the same region of memory. If Digital RoamAbout FH/PC Card is using the memory space D000, add the parameter EmmExclude=D000-D3FF. For more information, see your Window's manual.

No Radio Module Attached

The Digital RoamAbout FH/PC Card radio module must be attached to the adapter card in order for the Digital RoamAbout FH/PC Card to work properly.

Sleep Mode

The Digital RoamAbout unit that you are attempting to connect to may be in sleep mode. In this mode, it will not receive any radio signals. If the computer is set up as a server, disable sleep mode.

Wrong Socket

Make sure you specified the correct socket in which the Digital RoamAbout FH/PC Card is installed.

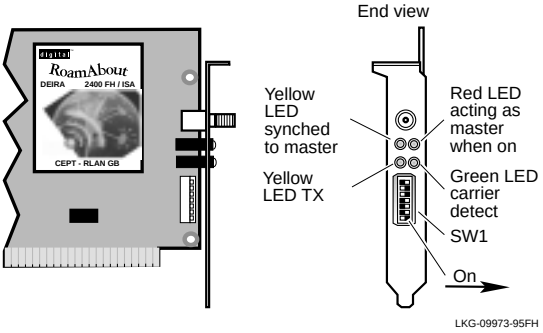
Digital RoamAbout FH LEDs

Interpreting the FH/ISA LEDs

The Digital RoamAbout FH/ISA has four LED lights. The following table describes what they indicate when lit.

This LED:	Indicates:
Red in the upper right	The card is acting as the master station when steadily lit. There should be only one card on the subnetwork with this light on at any time.
Yellow in the upper left	The RoamAbout FH/ISA card is synchronized to a master.
Bottom yellow	The card is transmitting.
Bottom green	The card detects another unit that is transmitting.

Digital RoamAbout FH/ISA LED Illustration

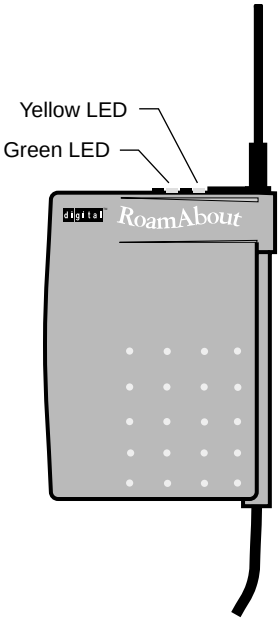


Digital RoamAbout FH/PC Card LEDs

The Digital RoamAbout FH/PC Card has 2 lights on the radio module. The following table describes what they indicate when lit.

This LED:	Indicates:
Yellow	The card is transmitting.
Green	The card detects another unit that is transmitting.

Digital RoamAbout FH/PC Card LED Illustration



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A
Setting the DIP Switch

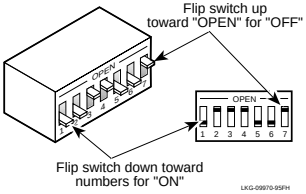
Digital RoamAbout FH/ISA Configuration

I/O Base Address

To configure the I/O base address of the Digital RoamAbout FH/ISA, use the DIP switch contained on the card. The setting selected using the DIP switch *must* match the setting specified when you configure the client or server driver.

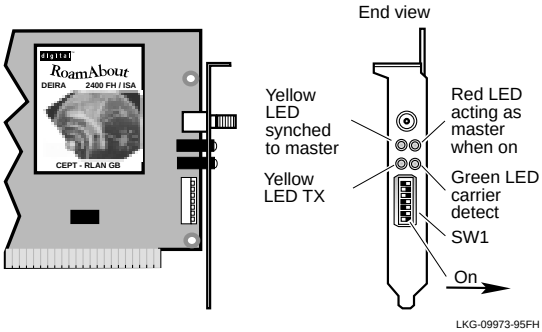
Setting the DIP Switch

The following illustration shows how to set the DIP switch.



DIP Switch Location

The following illustration show the location of the DIP switch.



I/O Address Configuration

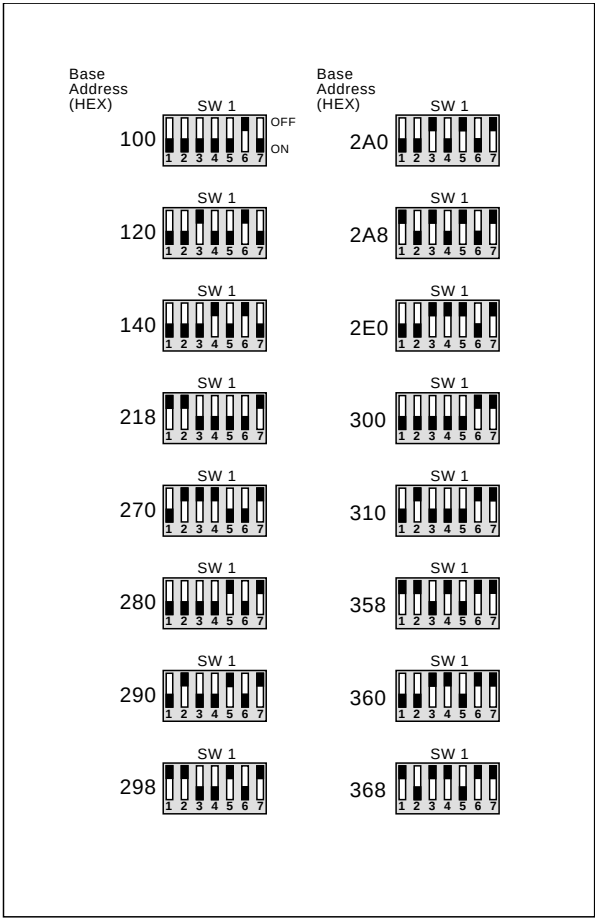
About the DIP Switch

The DIP switch selects the I/O base address of the board. The card consumes eight I/O addresses, starting with the base address selected using the switch.

Setting the Switch for the I/O Base Addresses

The following illustration shows settings for different I/O base addresses. Set the switch as shown.

Setting the DIP Switch



B

Digital RoamAbout Utilities

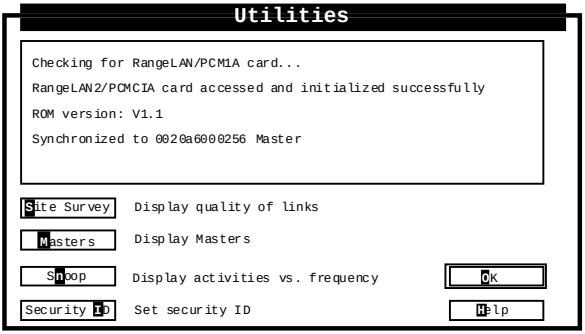
RL2SETUP Diagnostic Utilities

About RL2SETUP

To test the hardware settings of your Digital RoamAbout FH card, you can use the diagnostics in the RL2SETUP program that came on the driver diskette. If you have already installed the drivers using this program, you can find the RL2SETUP program in the directory containing your network files on your computer's hard disk.

RL2SETUP Window

The RL2SETUP window looks similar to the following:



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Accessing the Diagnostic Utilities

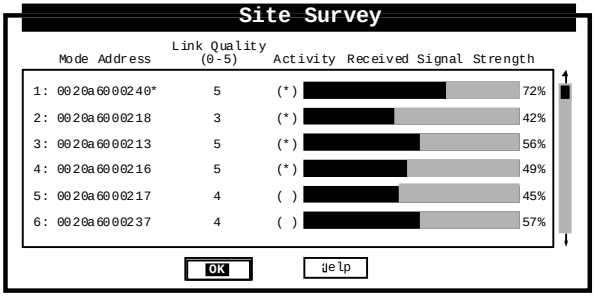
To access the diagnostic utilities, start the RL2SETUP program and choose the <Test / Utilities> button. You receive an error message if you have a hardware conflict between the Digital RoamAbout FH adapter and another adapter in your computer.

Site Survey Utility

Performing a site survey can help you decide where to place your Master station. To access the site survey utility, select the <Site Survey> button from the <Test/Utilities> box. You can then read the link quality and signal strengths of the other Digital RoamAbout products on the network.

Site Survey Utility Window

The Site Survey Utility window looks similar to the following:



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Setting the Digital RoamAbout Security ID

As an added security measure, Digital RoamAbout allows you to set a security ID for each Digital RoamAbout card installed on a network. **All cards must have matching security IDs in order to communicate.**

To access the Security ID utility, Select the <Security ID> button from the <Test/Utilities> Box. You can then set or change the security ID on the Digital RoamAbout FH card in your computer.

To change the security ID back to default settings, leave the security ID field blank and choose <OK>.

Master Search

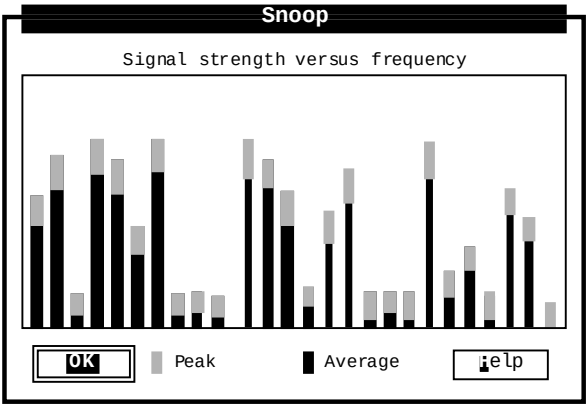
If you use the roaming feature of the Digital RoamAbout FH/PC Card, you may want to know which Master stations are within range. To display all the Master Stations within range along with their domain, channel, subchannel, and name, select the <Masters> button from the <Test/Utilities> box.

Snoop

To see the activity in the 2.40-2.4835 GHz band in which the Digital RoamAbout FH/PC Card operates, you can "snoop" this band. To do this, select the <Snoop> button from the <Test/Utilities> box.

Snoop Utility Window

The Snoop Utility window looks similar to the following:



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C
Specifications

Digital RoamAbout FH/ISA Specifications

Bus Interface	ISA Bus (PC/XT or PC/AT)
Range	Up to 500 feet
Data Rate	1.6 Mbps (uncompressed)
Media Access Protocol	CSMA/CA
Ethernet Compatibility	Ethernet packet types and Ethernet addressing
Frequency Band	2.4-2.483 GHz (spread spectrum frequency hopping)
Independent Channels	15
Output Power	100 mW
Size	1/2 card for PC XT/AT bus computers (3.9" x 6.2")

Digital RoamAbout FH/PC Card Specifications

Bus Interface	PC Card 2.0, Type II slot
Range	Up to 500 feet
Data Rate	1.6 Mbps
Media Access Protocol	CSMA/CA
Ethernet Compatibility	Ethernet packet types and Ethernet addressing
Frequency Band	2.4-2.483 GHz (spread spectrum frequency hopping)
Independent Channels	15
Output Power	100 mW
Size	PC Card Type II card with 3.5” x 2.25” x .5” antenna unit

D

Technical Support

Contacting Technical Support

Before You Contact Support

If you are having a problem using the Digital RoamAbout FH/ISA or PC Card and cannot resolve it by using the information in Chapter 9, gather the following information before calling your Digital customer support representative. See your warranty card or contact the person who sold you the Digital RoamAbout product for technical support telephone numbers.

- What kind of network operating systems are you using?
- What were you doing when the error occurred?
- What error message did you see?
- Does the problem occur all of the time or intermittently?
- Can you reproduce the problem?
- What version of the RoamAbout FH adapter and driver are you using? (check the version when the driver loads).

Information Sources

You can get additional information about Digital's network adapters from the following sources.

Information Source	How to Access
Digital Network Product Business Bulletin Board Service	Using a modem, connect to the Digital Network Product Business Bulletin Board Service (NPB BBS) by dialing 508-486-5777.
To order additional adapters	Call an authorized Digital reseller or Digital sales representative at 1-800-457-8211 (U.S. and Canada), or 508-692-2562

Glossary

Bandwidth

The size (in Hertz) of the frequency range that a signal transmission occupies. Typical narrow band signals occupy a 25KHz bandwidth. The RoamAbout signal occupies a 1 MHz bandwidth.

Bridge

An internetworking device that incorporates the first two layers of the OSI model and allows connection of networks or subnetworks with similar architectures.

Channel

In RoamAbout networks, the channel refers to the frequency hopping sequence the card follows.

CSMA/CA (Carrier Sense Multiple Access/Collision Avoidance)

CSMA is a protocol in which each node senses whether or not a channel is in use before attempting to transmit information. CA is an optimization by which channel time is reserved to avoid collisions.

Direct Sequencing

A spread spectrum technique by which the transmitted signal is spread over a particular frequency range.

FCC (Federal Communications Commission)

A U.S. government agency that regulates the use of Radio Frequency equipment.

Frequency Hopping

A spread spectrum technique by which the band is divided into a number of channels and the transmissions hop from channel to channel in a pre-specified sequence.

Interference

A situation that occurs when an unwanted RF signal occupies the same frequency band as a desired signal.

Narrow Band

A channel of about 25 KHz bandwidth in the RF spectrum. The FCC allocates Narrow Band channels and issues a license to the user. Each user of a specific narrow band frequency range must obtain a site license from the FCC.

PC Card

Refers to the standards for mobile computing as set by the PCMCIA. *See PCMCIA.*

PCMCIA

Personal Computer Memory Card International Association. An emerging standards body for mobile computing peripherals. Products using the PCMCIA standards are now referred to as PC Card products.

Radio Module

A RoamAbout PC Card network adapter component that consists of an antenna and radio circuitry.

RoamAbout Access Point (AP)

Digital's two-port transparent bridge that connects a wireless LAN to a wired Ethernet LAN.

Router

An internetworking device which incorporates the first three layers of the OSI model and connects multiple networks together.

Spread Spectrum

A radio data transmission modulation technique by which the transmitted signal is spread over a bandwidth wider than the information bandwidth. Spread Spectrum bands are designated by the FCC and require no user license.

Wireless LAN

A collection of end user systems connected together using a medium such as radio frequency or infrared technology.